

1           1.       A method for detecting a cancer in a tissue sample, the method comprising the  
2 steps of:

- 3                   (a)     providing the tissue sample; and  
4                   (b)     analyzing the tissue sample for the presence of a SIM2 marker, wherein  
5 presence of the SIM2 marker in the tissue sample indicates that the tissue sample contains a  
6 cancer.

1           2.       The method of claim 1, wherein the tissue sample is selected from the group  
2 consisting of a colon tissue sample, a prostate tissue sample, and a pancreas tissue sample.

3.       The method of claim 1, wherein the tissue sample is a prostate tissue sample.

4.       The method of claim 1, wherein the tissue sample is a pancreas tissue sample.

5.       The method of claim 1, wherein the tissue sample is a colon tissue sample.

6.       The method of claim 1, wherein the SIM2 marker is a SIM2 nucleic acid.

7.       The method of claim 6, wherein the SIM2 nucleic acid is a SIM2 mRNA.

1           8.       The method of claim 6, wherein the SIM2 nucleic acid is a native SIM2 nucleic  
2 acid.

1           9.       The method of claim 8, wherein the native SIM2 nucleic acid has a nucleotide  
2 sequence selected from the group consisting of SEQ ID NO:1 and SEQ ID NO:2.

1           10.    The method of claim 6, wherein the step (a) of providing a tissue sample  
2 comprises obtaining the tissue sample from a human subject; and the step (b) of analyzing the  
3 tissue sample comprises isolating RNA from the tissue sample, generating cDNAs from the  
4 isolated RNA, amplifying the cDNAs by PCR to generate a PCR product, and  
5 electrophoretically separating the PCR product to yield an electrophoretic pattern.

1           11.    The method of claim 10, wherein the step of amplifying the cDNAs by PCR is  
2 performed using an oligonucleotide primer comprising a nucleotide sequence selected from the  
3 group consisting of SEQ ID NOS:7, 8, 15, and 16.

1           12.    The method of claim 10, wherein the step of amplifying the cDNAs by PCR is  
2 performed using a first oligonucleotide primer and a second oligonucleotide primer, the first  
3 oligonucleotide primer comprising a nucleotide sequence selected from the group consisting of  
4 SEQ ID NOS:7 and 15, and the second oligonucleotide primer comprising a nucleotide sequence  
5 selected from the group consisting of SEQ ID NOS:8 and 16.

1           13.    The method of claim 12, wherein the presence of a 472 base pair nucleic acid in  
2 the electrophoretic pattern indicates that the tissue sample contains a cancer.

1           14.    The method of claim 6, wherein the step (b) of analyzing the tissue sample for the  
2 SIM2 nucleic acid comprises contacting the tissue sample with an oligonucleotide probe that  
3 hybridizes under stringent hybridization conditions to a polynucleotide having a nucleic acid  
4 sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, the complement of  
5 SEQ ID NO:1, and the complement of SEQ ID NO:2.

1           15.    The method of claim 14, wherein the oligonucleotide probe comprises the nucleic  
2 acid of SEQ ID NO:9.

1           16.     The method of claim 14, wherein the oligonucleotide probe further comprises a  
2 detectable label.

1           17.     The method of claim 1, wherein the SIM2 marker is a SIM2 protein.

1           18.     The method of claim 17, wherein the SIM2 protein is a native SIM2 protein.

1           19.     The method of claim 18, wherein the native SIM2 protein has an amino acid  
2 sequence selected from the group consisting of SEQ ID NO:3 and SEQ ID NO:4.

20.     The method of claim 17, wherein the step (a) of providing a tissue sample  
comprises obtaining the tissue sample from a human subject; and the step (b) of analyzing the  
tissue sample comprises contacting at least a portion of the tissue sample with a probe that  
specifically binds to the SIM2 protein.

21.     The method of claim 20, wherein the probe comprises a detectable label.

1           22.     The method of claim 20, wherein the probe comprises an antibody.

1           23.     The method of claim 23, wherein the antibody specifically binds to the peptide of  
2 SEQ ID NO:14.

1           24.     The method of claim 1, wherein the tissue sample comprises a cell isolated from  
2 a source selected from the group consisting of feces, urine, and peripheral blood.

1           25.    A method of modulating SIM2 gene expression comprising the steps of:  
2               (a)    providing a cell that expresses a SIM2 gene; and  
3               (b)    introducing into the cell an agent that modulates the expression the SIM2  
4 gene in the cell.

1           26.    The method of claim 25, wherein the agent is an oligonucleotide.

1           27.    The method of claim 26, wherein the agent is an antisense oligonucleotide.

1           28.    The method of claim 27, wherein the antisense oligonucleotide hybridizes under  
2 stringent hybridization conditions to a polynucleotide that encodes a SIM2 protein.

1           29.    The method of claim 28, wherein the antisense oligonucleotide is at least 18  
2 nucleotides in length and comprises a sequence that is a complement of a nucleic acid that  
3 encodes the SIM2 protein.

1           30.    The method of claim 27, wherein the antisense oligonucleotide comprises a  
2 nucleic acid sequence selected from the group consisting of SEQ ID NOs: 11 and 12.

1           31.    A method of identifying a test compound that modulates expression of a SIM2  
2 gene in a cell, the method comprising the steps of:  
3               (a)    providing a cell expressing a SIM2 gene;  
4               (b)    contacting the cell with the test compound; and  
5               (c)    detecting a modulation in the expression of the SIM2 gene, wherein  
6 detecting the modulation indicates that the test compound modulates expression of the SIM2  
7 gene.

32. The method of claim 31, wherein the cell is derived from a tissue sample selected from the group consisting of a colon tissue sample, a prostate tissue sample, and a pancreas tissue sample.

33. The method of claim 31, wherein the step of detecting the modulation in the expression of the SIM2 gene comprises analyzing the cell for a change in the intracellular concentration of a SIM2 marker.

34. The method of claim 33, wherein the SIM2 marker is a SIM2 nucleic acid.

35. The method of claim 34, wherein the SIM2 nucleic acid is a SIM2 mRNA.

36. The method of claim 33, wherein the SIM2 nucleic acid is a native SIM2 nucleic acid.

37. The method of claim 36, wherein the native SIM2 nucleic acid has a nucleotide sequence selected from the group consisting of SEQ ID NO:1 and SEQ ID NO:2.

38. The method of claim 33, wherein the SIM2 marker is a SIM2 protein.

39. The method of claim 38, wherein the SIM2 protein is a native SIM2 protein.

40. The method of claim 39, wherein the native SIM2 protein has an amino acid sequence selected from the group consisting of SEQ ID NO:3 and SEQ ID NO:4.

1           41.     A method for reducing the growth rate of a cancer comprising a cell expressing a  
2     SIM2 protein, the method comprising the step of:  
3           contacting the cell with an agent that inhibits the expression of the SIM2 protein  
4     in the cell.

1           42.     The method of claim 41, wherein the agent is an oligonucleotide.

1           43.     The method of claim 42, wherein the agent is an antisense oligonucleotide.

1           44.     The method of claim 43, wherein the antisense oligonucleotide hybridizes under  
2     stringent hybridization conditions to a polynucleotide that encodes the SIM2 protein.

1           45.     The method of claim 44, wherein the antisense oligonucleotide is at least 18  
2     nucleotides in length and comprises a sequence that is a complement of a nucleic acid that  
3     encodes the SIM2 protein.

1           46.     The method of claim 42, wherein the antisense oligonucleotide comprises a  
2     nucleic acid sequence selected from the group consisting of SEQ ID NOs: 11 and 12.

1           47.     The method of claim 46, wherein the nucleic acid sequence is SEQ ID NO:12.

1           48.     The method of claim 41, wherein the cancer is selected from the group consisting  
2     of a colon cancer, a prostate cancer, and a pancreas cancer.

1           49.     The method of claim 41, wherein the cancer is a colon cancer.

1           50.     The method of claim 41 wherein the cancer is in an animal.

- 1 51. The method of claim 50, wherein the animal is a mammal.
- 1 52. A kit for modulating expression of a SIM2 gene in a cell, the kit comprising:  
2 an agent that modulates the expression of the SIM2 gene in the cell and instructions for using the  
3 agent to modulate the expression of the SIM2 gene in the cell.
- 1 53. The kit of claim 52, wherein the agent is an oligonucleotide.
- 1 54. The kit of claim 53, wherein the agent is an antisense oligonucleotide.
55. The kit of claim 54, wherein the antisense oligonucleotide hybridizes under  
stringent hybridization conditions to a polynucleotide that encodes a SIM2 protein.
56. The kit of claim 55, wherein the antisense oligonucleotide is at least 18  
nucleotides in length and comprises a sequence that is a complement of a nucleic acid that  
encodes the SIM2 protein.
- 1 57. The kit of claim 54, wherein the antisense oligonucleotide comprises a nucleic  
2 acid sequence selected from the group consisting of SEQ ID NOs: 11 and 12.
- 1 58. The kit of claim 57, wherein the nucleic acid sequence is SEQ ID NO:12.